CLAIMS

What is claimed is:

1. A scanning line alignment compensation apparatus for a laser printer, comprising:

a laser scanning unit (LSU) having a first laser diode and a second laser diode and at least one sync signal detection sensor that generates a sync signal based on at least one of the first laser diode and the second laser diode based on selectively driving either of the first laser diode and the second laser diode, and generates at least one offset sync signal having first and second sensor detection periods based on the sync signal generated based on the at least one of the first laser diode and the second laser diode;

a compensation unit compensating for first and second video data input in synchronization with a video clock based on the first and second sensor detection periods; and

a laser diode control unit outputting control signals to control the first laser diode and the second laser diode based on the compensated first and second video data.

2. The apparatus of claim 1, wherein the compensation unit comprises:

a counting clock generation unit generating a counting clock using an inverter;

a first offset value calculation unit using the counting clock to calculate a first offset value that is a difference between the first sensor detection period, which is based on driving both the first laser diode and the second laser diode, and the second sensor detection period, which is based on the selective driving of the first laser diode and the second laser diode;

a second offset value calculation unit using the counting clock to calculate a second offset value, which is a difference between the sync signal generated based on the at least one of the first laser diode and the second laser diode and the video clock; and

a video data compensation unit compensating for a delay of the first and second video data based on the first offset value and the second offset value.

3. The apparatus of claim 2, wherein the at least one sync signal detection sensor comprises two sync signal detection sensors, and the first offset value is calculated by

obtaining a (1-1)-th offset value by counting a difference between a start point of the first sensor detection period and a start point of the second sensor detection period, based on the driving of only the first laser diode, and

obtaining a (1-2)-th offset value by counting a difference between a start point of the first sensor detection period and a start point of the second sensor detection period, based on the driving of only the second laser diode .

4. The apparatus of claim 2, wherein the at least one sync signal detection sensor comprises one sync signal detection sensor, and the first offset value is calculated by

obtaining a (1-1)-th offset value by counting the first sensor detection period, and

obtaining a (1-2)-th offset value by counting the second sensor detection period, based on driving either of the first laser diode and the second laser diode .

5. The apparatus of claim 2, wherein the at least one sync signal detection sensor comprises one sync signal detection sensor, and the first offset value is calculated by

obtaining a (1-1)-th offset value by counting a difference between a start point of the first sensor detection period and a start point of the second sensor detection period, based on the driving of only the first laser diode, and

obtaining a (1-2)-th offset value by counting a difference between a start point of the first sensor detection period and a start point of the second sensor detection period, based on the driving of only the second laser diode.

6. The apparatus of claim 2, wherein the first video data are compensated for based on compensating for the video clock by the second offset value, and the second video data are compensated for based on compensating for the video clock by the first offset value and the second offset value.

7. A scanning line alignment compensation method for a laser printer having a first laser diode and a second laser diode and at least one sync signal detection sensor that generates a sync signal based on at least one of the first laser diode and the second laser diode based on selectively driving either of the first laser diode and the second laser diode, and generates at least one offset sync signal having first and second sensor detection periods based on the sync signal generated based on the at least one of the first laser diode and the second laser diode, the method comprising:

generating the offset sync signal by the at least one sync signal detection sensor from a scanning light emitted from the first laser diode and the second laser diode;

compensating for first and second video data synchronized with a video clock based on the first and second sensor detection periods; and

outputting control signals to control the first laser diode and the second laser diode based on the compensated first and second video data.

8. The method of claim 7, wherein said compensating for first and second video data comprises:

calculating a first offset value, that is a difference between the first sensor detection period, which is based on driving both the first laser diode and the second laser diode and the second sensor detection period, which is based on the selective driving of the first laser diode and the second laser diode, based on a counting clock using an inverter;

calculating a second offset value, which is a difference between the sync signal generated based on the at least one of the first laser diode and the second laser diode and the video clock, based on the counting clock; and

compensating for a delay of the first and second video data based on the first offset value and the second offset value.

9. The method of claim 8, further comprising, when the at least one sync signal detection sensor comprises two sync signal detection sensors, calculating the first offset value by

obtaining a (1-1)-th offset value by counting a difference between a start point of the first sensor detection period and a start point of the second sensor detection period, based on the driving of only the first laser diode, and

obtaining a (1-2)-th offset value by counting a difference between a start point of the first sensor detection period and a start point of the second sensor detection period, based on the driving of only the second laser diode.

10. The method of claim 8, further comprising, when the at least one sync signal detection sensor comprises one sync signal detection sensor, calculating the first offset value by

obtaining a (1-1)-th offset value by counting the first sensor detection period, and

obtaining a (1-2)-th offset value by counting the second sensor detection period, based on driving either of the first laser diode and the second laser diode.

11. The method of claim 8, further comprising, when the at least one sync signal detection sensor comprises one sync signal detection sensor, calculating the first offset value by

obtaining a (1-1)-th offset value by counting a difference between a start point of the first sensor detection period and a start point of the second sensor detection period, based on the driving of only the first laser diode, and

obtaining a (1-2)-th offset value by counting a difference between a start point of the first sensor detection period and a start point of the second sensor detection period, based on the driving of only the second laser diode.

12. The method of claim 8, further comprising compensating for the first video data based on compensating for the video clock by the second offset value, and compensating for the second video data based on compensating for the video clock by the first offset value and the second offset value.

13. A scanning line alignment compensation apparatus for a laser printer, comprising:

a laser scanning unit having a first laser diode and a second laser diode, and generating a first sync signal and a second sync signal based respectively on light emitted by the first laser diode and the second laser diode, the first sync signal and the second sync signal respectively having a first sensor detection period and a second sensor detection period;

a compensation unit receiving video data and using the first sensor detection period and the second sensor detection period to compensate for the video data; and

a laser diode control unit controlling the first laser diode and the second laser diode based on the compensated for video data.

14. The apparatus of claim 13, wherein the laser scanning unit further comprises a first sync signal detection sensor and a second sync signal detection sensor corresponding respectively to the first laser diode and the second laser diode, the first sync signal detection sensor and the second sync signal detection sensor respectively generating a sync signal based on the first laser diode and a sync signal based on the second laser diode.

15. The apparatus of claim 14, wherein the compensation unit comprises:

a first offset value calculation unit receiving the first sync signal and the second sync signal and calculating a first offset value based on a positional difference between the first laser diode and the second laser diode;

a second offset value calculation unit receiving the sync signal based on the first laser diode and calculating a second offset value based on a difference between a pulse period of the sync signal based on the first laser diode and a video clock signal input to the compensation unit; and

a video data compensation unit receiving the first offset value and the second offset value and compensating for a vertical error between scanning lines generated due to a positional difference between the first laser diode and the second laser diode.

16. The apparatus of claim 15, wherein:

the first offset value is calculated by determining, for both the first sync signal and the second sync signal, a difference between a starting point of the first sensor detection period and a starting point of the second sensor detection period, and subtracting the two differences; and

the second offset value is calculated by determining a difference between a starting point of the sync signal generated based on the first laser diode and the video clock.

17. The apparatus of claim 15, wherein;

the video data comprise first video data and second video data;

the video data compensation unit compensates for the vertical error between scanning lines by delaying the first video data by the second offset value and delaying the second video data by both the first offset value and the second offset value; and

the laser diode control unit receives the compensated for first video data and second video data, generates a control signal based on the compensated for first video data and second video data, and sends the control signal to the laser scanning unit to adjust the light output from the first laser diode and the second laser diode.

18. The apparatus of claim 13, wherein:

the first sensor detection period of the first sync signal is generated by driving both the first laser diode and the second laser diode, and the second sensor detection period of the first sync signal is generated by driving only the first laser diode; and

the first sensor detection period of the second sync signal is generated by driving both the first laser diode and the second laser diode, and the second sensor detection period of the second sync signal is generated by driving only the second laser diode.